

17th-18th there was a marked increase in the force of the wind to 44 miles an hour at the a. m. observation of the 18th. The same morning, at 5 a. m., special observation from the U. S. S. *Denver* in latitude 17° 20' N. and longitude 85° 50' W. showed a barometer reading of 28.92 inches and a wind force of 12 from the southwest. Another valuable report from this vessel at 8 a. m. showed a 2-hour rise in barometer of 0.20 inch, which plainly indicated that the storm had at last begun to move northward, this information being included in the morning advisory warning of that date. The following warning was issued at 9 p. m. of the 18th:

Hurricane central about 20 north 86 west, apparently moving almost directly northward, attended by dangerous shifting gales. Vessels bound for southeastern Gulf of Mexico and Yucatan Channel should exercise every precaution. Hurricane will probably pass through Yucatan Channel or over extreme western Cuba late to-night or Sunday morning. Storm warnings extended northward to Cedar Keys and Titusville.

The hurricane passed over extreme western Cuba in the vicinity of Corrientes Bay before noon of the 19th according to information received later. At 9:30 a. m. of that date the following advisory warning was issued:

Hurricane warnings ordered 10:30 a. m. Jupiter to Punta Gorda, Fla., and northeast storm warnings extended northward to Jacksonville and Apalachicola. Hurricane center approaching extreme western end of Cuba, apparently moving north-northeastward, attended by dangerous shifting gales. Dangerous for vessels next 36 hours Florida Straits, southeastern Gulf of Mexico, and off southeast Florida coast.

At 5 p. m. of the 19th hurricane warnings were ordered displayed north of Punta Gorda to Cedar Keys. After reaching latitude 25 N. the hurricane turned rather sharply toward the east and passed inland near Cape Romano, Florida, about 50 miles south of Fort Myers, at about 8 p. m. of the 20th. It passed almost directly eastward over the Florida Peninsula with diminishing intensity, the center reaching the Atlantic Ocean some distance north of Miami on the morning of the 21st. The motor ship *Mexico* in latitude 26° 17' N. and longitude 79° 26' W., reported that the hurricane center passed at 10:20 a. m. The hurricane continued to move eastward until it passed beyond Great Abaco Island, Bahamas, after which it moved in an east-northeasterly direction. No reports were received from the region east of the Bahamas after the morning of the 22d. However, it is probable that the storm, with greatly diminished intensity, passed south of Bermuda on the morning of the 23d.

This hurricane was one of the worst ever known in extreme western Cuba; therefore a short description of its effects there and over the extreme southeastern portion of the Gulf of Mexico is given on page 513.

Frost warnings were issued on numerous dates during the month, the most important being those in connection with the cool wave that progressed steadily southward from Canada to the Gulf coast during the 20th-24th. On the latter date light frost formed as far south as Mobile, Ala., and heavy frost to Meridian, Miss., and Macon, Ga.—*C. L. Mitchell*.

CHICAGO FORECAST DISTRICT

Frost warnings.—At the beginning of the month the growing season had come to an end in most of Montana and Wyoming, but elsewhere in the district frost warnings were still required. Accordingly, these were issued from time to time as the conditions seemed to warrant, but as the month advanced the area where the warnings were needed became more and more restricted. In the eastern and southern portions of the district, the week beginning

on the 21st was cool and frosty, and killing frost occurred extensively. Frost warnings during the remainder of the month were needed only for a few limited sections, mainly in the extreme southern portion of the forecast district.

Cranberry marsh warnings.—The frost-warning service for the benefit of the cranberry interests in Wisconsin was terminated on the 7th, at which date most of the crop had been gathered. Several letters of appreciation for the services rendered during the 1924 season have been received.

Stock warnings.—The only livestock warnings issued were those of the 10th and 11th for Wyoming or portions thereof. In both instances the advices appear to have been justified.

Fire-weather warnings.—Fire-weather warnings were begun on the 25th for the benefit of the Forest Service at East Tawas, Mich., and were being continued at the close of the month.

Storm warnings.—No general severe storm affected the Great Lakes during the month, but one of considerable intensity prevailed over Lake Superior on the closing day. In two instances disturbances that developed marked intensity over the middle Rocky Mountain region were diverted from the normal course leading toward the Great Lakes by the presence of high-pressure area over the Northeast, and thus were forced to take a north-northeast or even a directly north track that carried the center into Canada far to the west of Lake Superior.

The most important disturbed periods were those covering the 5th, 8th-9th, and 30th-31st. On the morning of the 5th storm warnings were issued for the Upper Lakes, in connection with a disturbance then over northern Minnesota. The warnings were lowered 12 hours later, when it was evident that the storm was decreasing in energy. At most points where the displays were made strong winds occurred, and at Chicago the force of a moderate gale was reached.

On the 8th and 9th warnings were issued for Lake Superior and northern Lake Huron for a disturbance that moved northeastward from Colorado on the former date, at the same time losing energy. The center passed to the northward west of Lake Superior, and moderate gales occurred over most of Lake Superior on the afternoon of the 9th.

The last storm warning of the month, and the most important one, was that issued on the 30th. On the morning of that date a disturbance of considerable depth was over eastern South Dakota, while to the eastward, with its crest over the St. Lawrence Valley, lay a marked area of high pressure. The storm took a northeastward course and 24 hours later was centered north of Lake Superior. General storm warnings were issued in this connection, and in most cases verifying winds occurred. On Lake Superior the storm was rather severe. After subsiding on the 31st it underwent a redevelopment on the night of October 31-November 1, so that warnings had to be displayed again.—*C. A. Donnel*.

NEW ORLEANS FORECAST DISTRICT

Troughs of low pressure, forming in rapid succession over the Western States during the first decade, showed well-defined development on the eastern slope of the Rocky Mountains, but thereafter weakened and were displaced rapidly northward without having marked influence on the weather in this district. During the last few days of the month another trough, with strong

barometric gradient, behaved in similar manner. High pressure dominated conditions at most other times. Due to these conditions, the weather was abnormally dry in the eastern and central portions of the district, with much greater fire hazard than usual and much accumulation of smoke from numerous grass and small forest fires.

A moderate Gulf disturbance caused maximum wind velocities of 30 and 24 miles an hour from the east at Burrwood and New Orleans, respectively, early in the afternoon of the 12th. As the disturbance moved westward some distance off the shore the effects at other land stations in the district was less marked. Northeast storm warnings were ordered by the Washington office westward to Burrwood in the morning of the 12th, for the remainder of the Louisiana coast at night on the 12th, and for the middle and west coasts of Texas on the morning of the 13th. Small craft warnings were displayed at West End, on Lake Pontchartrain on the 12th, from 10 a. m. until night, and were justified. Small craft warnings were displayed also by the official in charge at Corpus Christi, Tex., on the 30th.

After a slow-moving tropical storm had passed eastward over southern Florida on the 21st, the conditions in the Gulf States remained under the influence of a large, sluggish area of high pressure for about a week, with daily frosts in most interior sections. These frosts were generally forecast. Frost warnings issued earlier in the month on the 5th and 8th for the extreme northwestern portion of the district were not justified, owing to cloudiness or insufficient cooling.

Fire-weather warnings were issued for forest areas in Oklahoma on the 8th, 11th, and 29th and in Arkansas on the 8th, 29th, and 30th, and conditions occurred as forecast.—*R. A. Dyke.*

DENVER FORECAST DISTRICT

Frequent precipitation in Colorado during the first two decades of the month, and occasional rains in the remainder of the district, resulted from a succession of storms that advanced eastward from the southern Plateau region. Heavy rains fell in northern Arizona on the 7th and heavy snows occurred in the mountains of Colorado on the 8th. After the 20th the important storms passed to the northward of the district and generally fair weather prevailed until the 29th, when snow or rain in Utah and Colorado attended a storm of decided intensity that moved southeastward from the north Pacific coast.

Special warnings were issued as follows: 2d, frost in northern New Mexico, heavy frost in Colorado and Utah, with freezing temperatures at the higher elevations of Colorado, Arizona, and Utah; 3d, frost in northern New Mexico; 4th, frost in Colorado, northern New Mexico, and Utah, with freezing temperature at the higher elevations of Colorado and Utah; 8th, frost in Colorado, northern and eastern New Mexico, and freezing temperature in southwestern Colorado; 11th, frost in Colorado, northern and western New Mexico, and northwestern Utah, with freezing temperature in western Colorado, extreme northwestern New Mexico, and eastern Utah; 12th, frost in southern New Mexico, freezing temperature in western Colorado, northern New Mexico, and southern and eastern Utah; 13th, frost in northwestern Colorado, freezing temperature in southern and eastern Colorado; 18th, frost in northern Colorado; 30th, frost

in southern New Mexico, south-central and southeastern Arizona, freezing temperature in Colorado and northern New Mexico; 31st, frost in south-central and south-western New Mexico.

Warnings of freezing temperature in the valleys of western Colorado were issued on the 18th, 19th, 20th, 22d, 26th, 27th, 28th, and 30th. All frosts and freezing temperature warnings were generally [i. e., over most of the areas for which they were forecast] verified.

Fire-weather warnings, containing forecasts of strong winds in northern and western New Mexico, northern Arizona, and Utah were issued on the morning of the 29th to the district foresters at Albuquerque, N. Mex., and Ogden, Utah. Strong winds prevailed in the territory specified on the 29th and in Colorado on the 30th.—*J. M. Sherier.*

SAN FRANCISCO FORECAST DISTRICT

The month of October, 1924, opened in this district with a moderate storm passing eastward through British Columbia, which gave rain over the northern portion of the district during the first three days of the month. On the afternoon of the 4th a small depression moved inland through northern California and caused rain in California and Nevada on the 5th and 6th. On the 6th a moderate storm moved inland in the vicinity of Juneau and gave rain in the North Pacific States from the 7th to the 9th and in the northern Plateau on the 9th and 10th. On the 11th a storm appeared off Sitka and moved southeastward along the coast, giving rain in the western portions of Washington and Oregon from the 12th to the 15th, when it passed southeastward through the North Pacific States and central Plateau and caused rain on the 15th and 16th in northern California. On the 20th a large storm of marked energy appeared in the Gulf of Alaska, moving slowly southeast, and remained off the northern coast during the remainder of the month. It gave rain in the North Pacific States and on the extreme northwest California coast from the 23d to the end of the month, in northern California from the 26th to the 29th, and in Nevada and Idaho on the 28th and 29th.

The rain in the first decade practically ended all danger from forest fires for this season, which was one of the driest and worst for forest fires on record.

Storm warnings were displayed on the Washington and Oregon and Puget Sound on the 2d, 11th, 13th, 14th, 15th, 20th, 26th, and 28th to 31st; and on the northern California coast on the 14th, 15th, 20th, 26th, and 28th to 31st. The warnings were generally timely and verified. Very rough and stormy weather prevailed in the north Pacific during the third decade and one coast steamer was wrecked and several disabled. The *Acme* was wrecked near Bandon, Oreg.; the *Saginaw* and the *Trinidad* were disabled and towed to Astoria, and the *Yellowstone* lost a deckload of lumber and a mast but was able to make port at Eureka and the *Ocean Queen* was disabled off the Golden Gate and towed into San Francisco. No loss of life was reported.

Special forecasts were made for the dirigible airship *Shenandoah* during a flight from San Diego to Seattle and return. The forecasts were highly commended by the officer in charge. The flight was made during a lull between two storms, and it is believed that the advices given were in a great measure responsible for the successful voyage.—*G. H. Willson.*